

Status Report
Four Corners Modeling Study
August 8, 2008

Current Activities

From January 2008 to July 2008, ENVIRON and Four Corners Modeling Group compiled a 2018 base case emissions inventory for the 4 km domain and performed photochemical modeling of the 2005 base case.

- A map of the 4km domain and a summary of 2005 and 2018 emissions inventories for the modeling is available on the website:
<http://www.nmenv.state.nm.us/aqb/4C/Modeling.html>

Base Case Modeling

Initial photochemical model simulations with the 2005 base case emissions inventory identified model performance issues with various particulate matter (PM) species. A series of diagnostic analyses and sensitivity runs were undertaken to identify the cause of the poor agreement with observations. Improvements to model inputs were made on the basis of these analyses which resulted in better model performance although organic carbon still shows large under-predictions. It was decided that these under-predictions would not materially affect the evaluation of the alternative mitigation strategies being contemplated.

Overall model ozone prediction performance was reasonable, but more detailed examination of results showed that predicted ozone levels at high elevation locations during late spring into early summer were too high. Limited available ozone monitoring data suggested that the model was over predicting ozone by 20 – 40 parts per billion (ppb) on some days. This finding led to the initiation of a series of performance evaluations and sensitivity runs. The Four Corners Modeling group and ENVIRON have assessed results from these analyses and concluded that there was a problem with how the top layer of the atmosphere was being treated in the model, which lead to an unrealistic simulation of stratospheric ozone impacting at the surface over the mountains. This problem was fixed and test runs now show much more realistic ozone predictions. ENVIRON is now re-running the full-year 2005 base case model simulation and will prepare a revised ozone and PM model performance evaluation which is expected to demonstrate acceptable performance for this project.

2018 Base Year Emissions

2018 base year emissions estimates were completed in June 2008. The 2018 base year emissions include growth estimates and rules on the books including EPA's New Source Performance Standards (NSPS) for Spark Ignition Internal Combustion Engines (Jan 18, 2008).

Mitigation Scenarios

Following completion of the revised 2005 base case model evaluation, ENVIRON will run both the 2018 base case modeling and 5 mitigation scenarios. The regulatory agencies decided in September 2007 that the mitigation runs would include two scenarios for oil

and gas (a low control option and a high option), one for power plants, and one representing high level of controls on all sources, with one mitigation run held in reserve.

The modeling workgroup and ENVIRON will soon (by October 2008) develop specific emission levels to include in the modeling for each of the above scenarios. It was decided to wait until the 2005 and 2018 base case models and 2018 source apportionment results are available so that mitigation strategies can be more effectively targeted.

In addition, BP will suggest specific VOC reduction measures that could be incorporated into the high control option (scenario 3) mitigation modeling scenarios. (The workgroup had previously suggested a 5-20% VOC reduction for Scenario 3).

Source Apportionment

Ozone and PM source apportionment runs are used to estimate the contribution of selected source groups (where groupings are either by source type and/or geographic region) to predicted ozone and PM concentrations. BP has agreed to fund this analysis. ENVIRON will conduct the source apportionment analysis for ozone and PM on the 2018 base case run to look at the relative impact of major source categories and locations (both within and outside of the Four Corners area).

Overall Schedule

There have been some substantial delays in the Four Corners modeling project due to a variety of reasons including: (1) 2005 & 2018 emissions inventory detail and compilation taking longer than expected, in part because an improved inventory for oil and gas sources on Southern Ute Indian Tribe (SUIT) land became available and was incorporated and (2) model performance issues with elevated ozone levels predicted during the late spring to early summer time periods. The anticipated schedule from here forward is as follows:

- We anticipate completion of 2005 base case runs by end of August 2008 along with model performance evaluations.
- After base case 2005 runs are complete we will begin 2018 ozone source apportionment (OSAT) model run. We anticipate this will take 3-4 weeks.
- After completion of the 2018 OSAT run, we will begin the 2018 PM source apportionment (PSAT) run. It is not known at this time how long the PSAT run will require.
- We will be using 2018 OSAT and PSAT results to reevaluate the mitigation scenarios. We plan to finalize the mitigation scenarios using more specific source (using Standard Industrial Classification (SIC) code) percent reductions associated with mitigation by about October 15, 2008 at which time modeling of the mitigation scenarios will begin.
- All modeling work is now anticipated to be complete by the end of 2008
- Modeling results will be presented at a Four Corners Air Quality Group (4CAQG) update meeting held in February 2009 in Durango, CO at Ft. Lewis College
- Modeling results will also be made available online, <http://www.nmenv.state.nm.us/aqb/4C/Modeling.html>, by the end of 2008.